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(54) AUTOMATIC MOP MANUFACTURING APPARATUS

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[There are no amendments to this patent.]

## 1. Title of the invention

Automatic mop manufacturing apparatus

## 2. Claims

An automatic mop manufacturing apparatus characterized by the fact that conveyors with a narrow width which support the center part of a material to be conveyed are provided in a necessary number and arranged at a prescribed interval, the end terminal part of each narrow conveyor is arranged parallel to the start of movement terminal part of the post-processing mechanism to be mentioned later, the start of movement terminal part of each narrow conveyor faces the end of movement terminal part of a wide conveyor which leads out from the initial processing mechanism to be mentioned later, respectively arranged at the front and rear positions, and moreover, the narrow conveyor which is linked to the initial processing mechanism at the rear position is designed to be linked to the wide conveyor by passing above the initial processing mechanism at the front position, each initial processing mechanism facing the start of movement terminal part of the narrow conveyor is comprised of a string material feed mechanism which feeds a string material while revolving the extraction port, a winding mechanism which winds the string material fed by said feed mechanism into a flat coil shape then fed to a stitching mechanism which stitches together the front and rear center parts of the flat wound shape which is string material fed from said string material feed mechanism, and a cutting mechanism for forming a fringed shape by cutting the two sides of the flat coil shape string material in which the center part has been stitched by said stitching mechanism, and also, the post-processing mechanism which faces the end of movement terminal part of a necessary number of narrow conveyors is comprised of a canvas feed mechanism which overlays a canvas of prescribed width on the fringed string material fed from each narrow conveyor and a stitching and fabricating mechanism which feeds out by stitching the center part of the fringed string

materials from above the canvas overlayed on the string materials by said canvas feed mechanism, so that the cut end parts of the fringed string material hang down by conveying the center part of the string material formed into a fringed shape according to each initial processing mechanism onto each narrow conveyor, and it is then formed into a mop of prescribed width by feeding to each post-processing mechanism in parallel and being combined with the canvas.

### 3. Detailed explanation of the invention

The present invention relates to an automatic mop stitching apparatus designed so that an initial process of forming a string material into a fringed shape and a postprocess for combining the fringed string material with canvas can be executed continuously.

In the application example in the figures, (1) ... (1) are conveyors with a narrow width provided in a necessary number and arranged in at a prescribed interval; start of movement terminal part (1a) in each of said narrow conveyors (1) ... (1) faces the end of movement terminal part of wide conveyors (2) ... (2) which lead out from initial processing mechanisms (A) ... (A) to be mentioned later respectively arranged at the front and rear positions; also, narrow conveyor (1) which is linked to initial processing mechanism (A2) at the rear position is designed to be linked to wide conveyor (2) by passing above initial processing mechanism (A1) at the front position, and also, the end of movement terminal parts (1b) of narrow conveyor (1) ... (1) are arranged parallel to the start of movement terminal parts of postprocessing mechanisms (B) ... (B) to be mentioned later. Also, each initial processing mechanism (A) ... (A) which faces start of movement terminal part (1a) of narrow conveyors (1) ... (1) is comprised of a string material feed mechanism (3) which feeds string material (4) while revolving extraction port (3a); winding mechanism (5) which winds string material (4) fed by said feed mechanism (3) into a flat, wound shape and then feeds it to stitching mechanism (6) which stitches together the

front and rear center parts (4c) of flat wound string material (4') fed by said string material feed mechanism (5), and cutting mechanism (7) for forming into a fringed shape by cutting the two side parts of the wound string material (4') in which center part (4c) has been stitched by said stitching mechanism (6). Also, post-processing mechanisms (B) ... (B) which face end of movement terminal part (1b) of necessary number of narrow conveyors (1) ... (1) are comprised of canvas feed mechanism (9) which overlays canvas (B) of a prescribed width on fringed string material (4'') fed from each narrow conveyor (1) ... (1) and stitching and fabricating mechanism (10) which feeds out while stitching center parts (4c) ... (4c) of the fringed string materials from above canvas (8) over each string material (4) by said canvas feed mechanism (9).

String material (4) is fed out while revolving extraction port (3a) of string material feed mechanism (3); front and rear center part (4c) of flat wound string material (4') is stitched as shown in Figure 7(b) with stitching mechanism (6), while winding and feeding string material (4) into a flat wound shape as shown in Figure 7(a) with winding mechanism (5), and both side parts of wound string material (4') are cut and formed into a fringed shape as shown Figure 7(c) with cutting mechanism (7). By conveying string material (4'') formed in this way into a fringed shape according to initial processing mechanism (A) onto narrow conveyor (1) from wide conveyor (2), fringed string material (4'') is provided with hanging cut end parts (4e) as shown in Figure 7(d). When fringed string material (4'') in which the center part is supported on narrow conveyor (1) and hanging cut end parts (4e) is fed into postprocessing mechanism (B) from end of movement terminal part (1b) of narrow conveyor (1), it is arranged parallel along with fringed string materials (4'') ... (4'') conveyed from other narrow conveyors (1) ... (1) by maintaining a prescribed spacing, and along with being overlayed with canvas (8) as shown in Figure 7(e) by canvas feed mechanism (9), the center part of fringed string materials

(4") ... (4") is stitched from above overlayed canvas (8), and then forms a mop of prescribed width like that shown in Figure 6. Fringed string material (4") fed from initial processing mechanism (A2) at the rear position is temporarily raised to a high position by wide conveyor (2), lead into end of movement terminal part (1b) of narrow conveyor (1) by passing over initial processing mechanism (A1) at the front position, and is fed into postprocessing mechanism (B).

In the conventional manufacture of a mop, a postprocess of combining the canvas by stitching after arranging the fringed string materials according to the initial process at a prescribed spacing by manual operation made the process very complex, a high degree of expertise was necessary, and the method was not suited for mass production and caused high costs.

According to the apparatus of the present invention, the initial process for forming the string material into a fringed shape and the postprocess of combining the fringed string materials and the canvas are executed continuously by mechanical operation, therefore it can be produced at a very high efficiency and the cost can be reduced considerably.

#### 4. Brief description of the figures

Figure 1 is a plan view showing the overall constitution of the apparatus in the present invention, Figure 2 is a plan view of the initial processing mechanism part in the apparatus of the present invention, Figure 3 is a side view thereof, Figure 4 is a plan view of the postprocessing mechanism part in the apparatus of the present invention, Figure 5 is a side view thereof, Figure 6 is a main part perspective view of a mop which was stitched and fabricated by the apparatus of the present invention, Figure 7 is a cross-sectional view showing the mop manufacturing procedure according to the apparatus of the present invention, (a) shows the winding of a string material into a flat wound shape with the winding mechanism, (b) shows the stitching together of the front and rear center part of the flat wound

string material with the stitching mechanism, (c) shows the fringing of the wound shape string material by cutting both sides with a cutting mechanism, (d) shows the cut end parts on both sides hanging down by conveying the fringed shape string materials on narrow conveyors, and (e) shows the canvas being overlayed on the fringed string materials arranged at a prescribed spacing.

(A)...initial processing mechanism, (A1)...initial processing mechanism arranged at the front position, (A2)...initial processing mechanism arranged at the rear position, (B)...postprocessing mechanism, (1)...narrow conveyor, (1a)...start of movement terminal part, (1b)...end of movement terminal part, (2)...wide conveyor, (3)...string material feed mechanism, (3a)...extraction port, (4)...string material, (4')...flat wound string material, (4'')...fringed wound material, (4c)...center part, (4e)...cut end part, (5)...winding mechanism, (6)...stitching mechanism, (7)...cutting mechanism, (8)...canvas, (9)...canvas feed mechanism, (10)...stitching and fabricating mechanism.

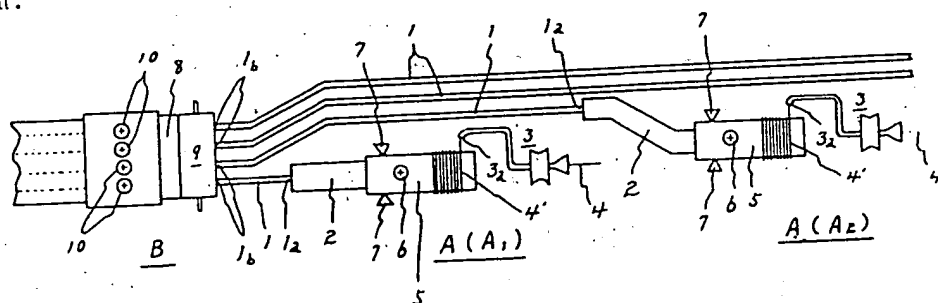


Figure 1

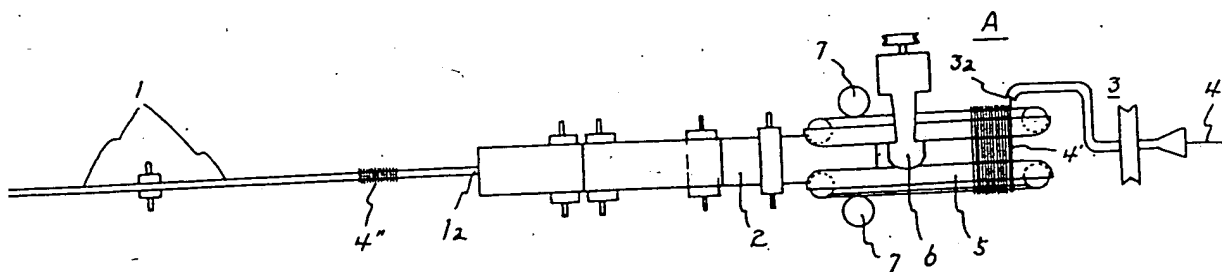


Figure 2

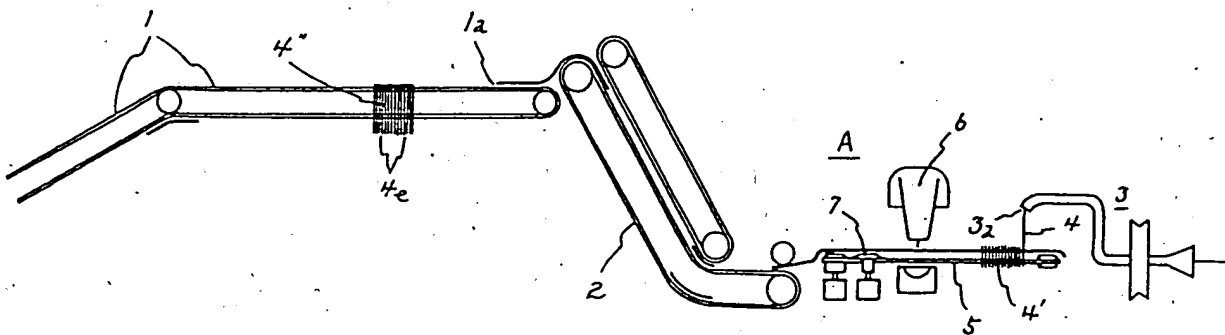


Figure 3

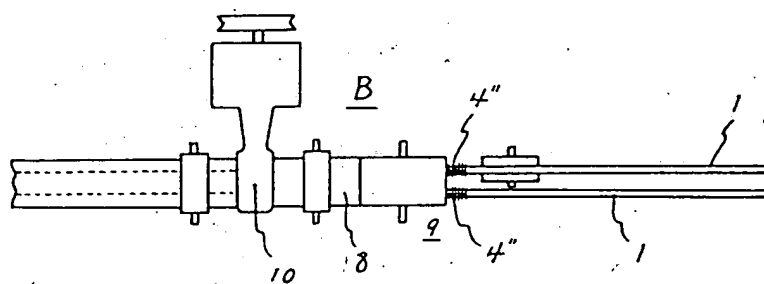


Figure 4

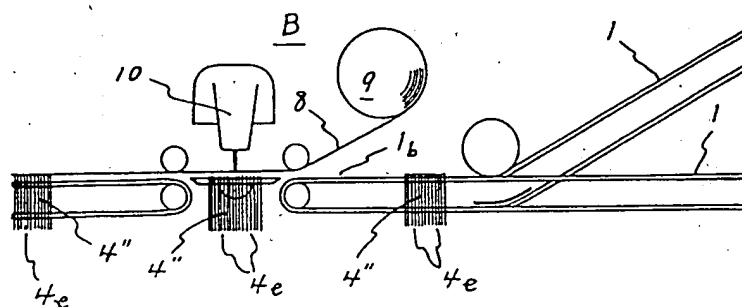


Figure 5

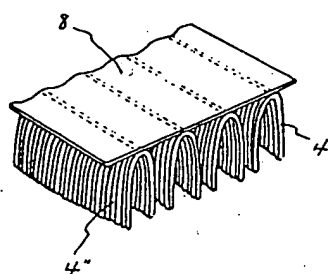


Figure 6

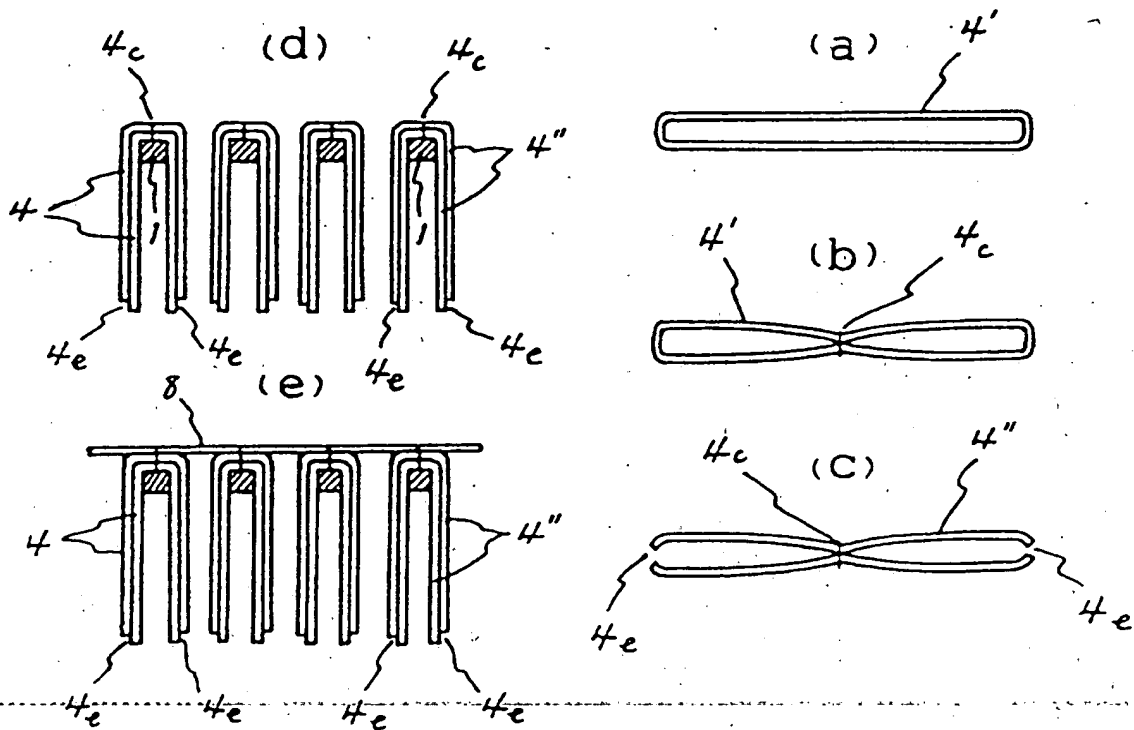


Figure 7



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